well be imagined. A supply having been obtained from the Parson Drove Mill, a series of attempts were made in flasks and beakers to get the blue colour, but they all proved unsuccessful. It was then determined to experiment on a larger scale. Having secured the assistance of a colleague, Mr. C. G. Barrett, we started an eight gallon vat in a small barrel, in a steam laundry. The directions of Hellot were closely followed—woad, weld, bran, madder, lime and hot water were duly mixed, the vat carefully covered, and periodically stirred—the result being, not a little to my surprise, that at the end of twelve hours a skein of wool, after an hour's immersion in the filthy-looking liquor, turned a good "pastel blue" on exposure to the air. A number of experiments were then made on a smaller scale, which we found answered equally well, and proved that it is as easy to dye wool blue with our English woad to-day as it was 300 years ago; any housewife could do it now, if need be, as easily as then. It is simply a question of digesting the woad at a temperature of from 100° to 140° F. (40° to 60° C.) for a prolonged period. We found half a pound of woad (500 grammes) to a gallon (4 litres) of water quite enough to yield good results. The water should be poured on the woad nearly boiling, the vessel closely covered at first, and kept heated to the above temperature. This can very conveniently be done by placing it on the brickwork of a steam boiler. In from ten to twelve hours small bubbles will begin to appear on the surface of the liquor; a little recently slaked lime (6 or 7 grammes) should now be stirred in, one noticeable effect of which will be the generation of an ammoniacal odour. A small pattern of wool left in for an hour will become pale blue on exposure to the air. In the course of a few hours a gramme or so of bran will set the fermentation up again, which in its turn can be controlled by adding lime. In this way the process may be kept going on for several days.

The longer and more often the patterns are immersed the darker they become—at first pale blue, they will eventually become dark blue—almost black. The paler shades are apt to have a green tint, and it was "to kill the green" that the older books on dyeing recommend the addition of a small quantity of madder.

It must be remembered that the quantity of indigo in woad is but small, so that experiments with less than half a pound are not likely to be successful; the great point, however, is keeping the temperature about 100° to 120° F. for many hours.

Our ancestors had neither steam boilers nor thermometers, but they would be able to keep the contents of an earthen vessel "nicely warm," as judged by the hand, by placing it on the hearth, when the embers were kept alight all night, for in those times kindling a fire by flint and steel was always an undertaking.

My thanks are due to Mr. C. G. Barrett for his great help in conducting these experiments, and for the facilities he has afforded for carrying them out, as well as to Mr. Fitzalan Howard, Prof. Penzig, of Genoa, and Sir Thomas Wardle.

King's Lynn, March 31. CHARLES B. PLOWRIGHT.

Illogicality concerning Ghosts.

MR. HERBERT SPENCER, exposing the various inconsistencies that occur so frequently in the ghost-stories of the savage races, says:—"How illogicalities so extreme are possible, we shall the more easily see on recalling certain of our own illogicalities. Instance . . . that familiar absurdity fallen into by believers in ghosts, who, admitting that ghosts are seen clothed, admit, by implication, that coats have ghosts—an implication they had not perceived" ("The Principles of Sociology," 3rd edition, vol. i. p. 104). It seems interesting to note that the same opinion was expressed about nineteen centuries ago by the Chinese philosopher, Wang Chung (*circa*, 27-97 A.D.), whose sceptic remarks on the traditions of all manners, handed down to his time in the Middle Kingdom, form a celebrated work named "Lun Han" or "Balance of Discussions." In its twentieth book (fol. 14-15 in Miura's edition, Kyôto, 1748), he says:—"Since the beginning of the world, so vast has been the number of the deceased, that it enormously exceeds that of the whole present population. Therefore, should every one become a ghost after death, man is bound now to meet a ghost at each step on the road, and should he see ghosts in his dying moments, he ought to find not one or two singly, but several millions of them collectively filling the space. When a man dies by a weapon, his blood, the essence of his life, turns to what is termed *ignus-fatuus*, which has no resemblance to him, but gathering itself into an amorphous mass, looks like the light of fire. It is the ghost of blood, and presents an aspect quite different from a live man's blood, and, as the essence of life has been separated from the man's body, it cannot resume his shape in life. If all ghosts be seen in the form of dead corpses, you have reason to suspect the dead to become the ghost. . . . And, equally, a disordered fellow might be true in seeing a ghost of his live friend visiting him. But how could he see a dead man in his shape of lifetime? . . . . As warm ashes, even after the fire has gone out, can be made to produce it again, we may with some reason suggest the possibility of a dead man appearing in the same form as alive. When we know well, however, that a fire once extinguished can never burn anew, it is evident that a dead man can never become a ghost. And now, what is the ghost? All say it is the soul of a deceased. *Then, even if it could be seen by man, it ought to appear stark naked and fully disrobed: for the clothes have no soul to cover the dead man's soul; while the latter has no material body to put on a material raiment.* Soul is an outcome of blood and breath, which, though dependent on body during man's life, are the things distinct from it; hence it might be still well to suppose soul able to survive body as a ghost. But the clothes consist of nothing but threads, cotton, hemp and silk, which have all no intercurrence of blood and breath imparted by the wearer's body; nor do they possess any blood and breath of their own; so that even when they keep their form entirely, they are as soulless as a human corpse; and how then could they resume their former shape after their total decomposition? Thus, saying that a ghost appears clad necessitates the admission of its possession of body; which view itself militates against the definition of the ghost, because, according to this statement, the said ghost is a composite of the ghosts of body and clothes, which is essentially different from the soul of a deceased individual."

It is curious to observe that Wang Chung himself is quite illogical in esteeming it just to suppose a ghost able to appear only divested: for, according to his own proposition, the soul exists only in blood and breath; while the body, though very closely connected with them during life, is, after death, as severed from them as the ever lifeless and soulless clothes; so that, should it be necessary for a ghost to appear divested, it would be equally so to appear disembodied at the same time.

April 2. KUMAGUSU MINAKATA.

Fertilisation of Flowers in New Zealand.

ON p. 16 of your issue of November 2, 1899, reference is made to an article in the London *Quarterly Review*, by "A Field Naturalist," in which the writer expresses the opinion that "under natural and equal conditions, self-fertilisation of flowers is both the legitimate fertilisation and the most productive." I have not seen the article, but would like to place on record the following facts, which may be of interest to botanists in this connection.

I have cultivated most of the common flowers of the European and North Temperate region during the last thirty years, and have kept a pretty close record of their behaviour under the somewhat altered conditions in which they are placed in New Zealand. In this part of the colony the climatic conditions are not very dissimilar to those of the milder and moister parts of Britain, but the insects are, of course, totally different.

Previous to 1885, when humble-bees were first introduced into New Zealand, certain flowers, which were freely cultivated here, never produced seeds under natural conditions. But since the bees have become numerous and have spread over the colony, the conditions have quite changed. Primroses, cowslips, and the various hardy hybrid primulas all seed freely. So do pansies, crocuses (except the common yellow Dutch, which does not seem to be fertilised by the bees), Canterbury bells, antirrhinums, and many others which formerly never seeded. Now we find the plants in the spring-time surrounded by crowds of self-sown seedlings.

The bees were introduced, as is well known, by the Canterbury Acclimatisation Society, for the purpose of fertilising the flowers of the common red clover—*Trifolium pratense.* It was supposed at the time, that the insect which was introduced was *Bombus terrestris*, which, by the way, is unable to fertilise the flowers of red clover on account of the shortness of the trunk. As a matter of fact, some of the nests brought out to the colony were those of *B. terrestris*, but among them were also two varieties of *B. hortorum*, and it is this latter long-trunked species which is now so abundant, and fertilises so many of the introduced flowers.

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In spite of the fact that primroses and other flowers are now enabled to produce seed by the agency of the bees, attempts to introduce them into the woodlands and open spaces and to get them to go wild there are still quite unsuccessful. Certain grasses, particularly cocksfoot, *Poa annua* and *Poa pratensis*, are too aggressive, and choke out nearly all other small vegetation. GEO. M. THOMSON.

Dunedin, N.Z., February 16.

JUBILEE OF THE ROYAL METEOROLOGICAL SOCIETY.

THE Royal Meteorological Society attained its Jubilee on Tuesday, April 3, having been founded on April 3, 1850; and this fiftieth anniversary was celebrated by the holding of a commemoration meeting, a conversazione, and a dinner.

The commemoration meeting was held at the Institution of Civil Engineers, in the afternoon of the 3rd inst., and was numerously attended. The following delegates from other societies had been appointed, most of whom were present, viz., the Royal Society, Prof. J. J. Thomson, F.R.S.; Royal Astronomical Society, Mr. E. B. Knobel, President; Royal Geographical Society, General Sir Henry W. Norman, G.C.B., G.C.M.G., C.I.E.; Geological Society, Mr. J. J. H. Teall, F.R.S., President; Institution of Electrical Engineers, Prof. Silvanus P. Thompson, F.R.S., President; Royal Agricultural Society, Sir Ernest Clarke, Secretary; Royal Horticultural Society, Sir Trevor Lawrence, Bart., President; Royal Botanic Society, Major J. W. N. Cotton; Scottish Meteorological Society, Mr. R. C. Mossman; Sanitary Institute, Mr. A. Wynter Blyth; Hertfordshire Natural History Society, Mr. J. Hopkinson; and Oxfordshire Natural History Society, Mr. H. Balfour, President. The German Meteorological Society sent, as their delegate, Prof. Dr. G. Hellmann.

The Secretary, having read a number of letters and telegrams, the President, Dr. C. Theodore Williams, expressed his great pleasure and satisfaction in receiving good wishes and congratulations from so many friends, and especially from foreign meteorologists and meteorological societies. He then read the address which the late Mr. G. J. Symons, F.R.S., had prepared for the occasion, and added some remarks of his own in appreciation of Mr. Symons, and also on the work of the Society.

The earliest English meteorological observer and recorder, of whom the work has come down to the present day, was the Rev. William Merle, whose record of observations for the seven years 1337–1344 is still preserved in the Bodleian Library at Oxford. The earliest English book on the weather was issued about 1530, the title being "Godfridus: Here begynneth The Boke of Knowledge of Thynges Vnknowen apperteynynge to Astronomye, with certayne necessary Rules," &c. Among the early meteorological authors and observers, Mr. Symons mentioned the Rev. Dr. John Goad, 1686; the Hon. Robert Boyle, 1659; Dr. Robert Plot, 1683; and Sir Christopher Wren, 1697.

The first English Meteorological Society was founded in 1823, on the suggestion of Mr. J. G. Tatem, but it only survived for a few years. A second Society was started in 1836 by Mr. W. H. White, which continued in existence for some years, and included among its members the late John Ruskin. The present Society was founded on April 3, 1850, by Mr. James Glaisher, F.R.S., with the co-operation of Dr. J. Lee, F.R.S., and several others. This was called "The British Meteorological Society" until 1866, when a Royal Charter of Incorporation was obtained, and the name was changed to "The Meteorological Society." In 1882 Her Majesty the Queen accorded the Society permission to adopt the prefix "Royal." For many years the Society had no habitation; but in 1872 a room was engaged at 30 Great George Street, Westminster, and an assistant secretary appointed. Since that time great progress had been made, the work of the Society had greatly increased, and a large and valuable library had been got together. The offices now comprise a suite of rooms at 70 Victoria Street. Both Mr. Symons and Dr. Williams referred, in some detail, to the work which had been done by the Society, and to the investigations which were still in progress.

Congratulatory addresses were delivered by Prof. J. J. Thomson, F.R.S., Mr. E. B. Knobel, Mr. J. J. H. Teall, F.R.S., Mr. R. C. Mossman and Mr. A. Wynter Blyth. Dr. G. Hellmann handed to the President an address from the German Meteorological Society, and also spoke of the valuable work accomplished by the Royal Meteorological Society. The President then presented to the delegates a commemoration medal which had been struck for the occasion.

A conversazione was held in the evening at the Royal Institute of Painters in Water-Colours, Piccadilly. In addition to the music provided by the Royal Artillery String Band and by the "Schartau" Part-Singers, an exhibition of meteorological instruments, &c., was arranged in an adjoining room. This included many interesting and historic instruments, among which were some used by Dr. Livingstone in his travels through Africa, and the aneroid barometer used by Mr. Glaisher and Mr. Coxwell in their famous balloon ascent from Wolverhampton on September 5, 1862, when they attained an altitude of seven miles from the earth. During the evening lantern demonstrations were given (1) by Mr. T. C. Porter (of Eton), showing the growth of eclipse of the shadow of the Peak of Teneriffe by the shadow of the earth; (2) by Colonel H. M. Saunders on clouds; and (3) by Mr. W. Marriott, on meteorological phenomena and portraits of presidents of the Royal Meteorological Society.

On Wednesday morning, the 4th inst., a large number of the Fellows went down to Greenwich, and were, by permission of the Astronomer Royal, shown over the Royal Observatory. In the afternoon a visit was paid to the Painted Hall and the Naval Museum.

In the evening a dinner was held at the Westminster Palace Hotel, under the presidency of Dr. C. Theodore Williams. General Sir Henry W. Norman, in responding for the Army, stated that as senior officer he had taken Lord Roberts under fire for the first time. He also brought a message from the Royal Geographical Society congratulating the sister society on the attainment of its jubilee. Mr. W. N. Shaw, F.R.S., in proposing the toast of the evening, said that the history of the Royal Meteorological Society was fifty years of development and co-operation in meteorological research—a development which had taken place chiefly in the direction of combining the observations of many persons in different parts of the country for the single purpose of advancing our knowledge of atmospheric phenomena. Dr. Williams, the President, replied. In replying for "The Delegates from other Societies," Prof. Silvanus Thompson, F.R.S., spoke of the contact of electricity with meteorology, and pointed out how that science had keenly interested many of the inquirers into magnetic and electrical matters, from Boyle to Lord Kelvin, for it was impossible for a man to work at physics generally without coming across the physics of the earth, the atmosphere and the sea. Speaking of the interference caused to magnetic and meteorological observations by leakage from electric-light and traction systems, he said such leakage was quite unnecessary. It arose from the adoption of methods that had, perhaps, been adopted without due consideration, and it was possible to propel electrical tram-cars without corrosion of gas and water-pipes, and without disastrous consequences to meteorological and magnetic observations.

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